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Reviews
Perspectives from Gene Anderson's Bookshelf

The World of Sugar: How the Sweet Stuff Transformed Our Politics, Health, and Environment over 2000 Years. By Ulbe Bosma. 2023. Harvard University Press, Cambridge. 448 pp.

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Ulbe Bosma offers us another enormous comprehensive book on sugar. This is the most comprehensive of them all, taking the story from origins to the latest news. Previous books include George Beckford's (1972) *Persistent Poverty*, on the Caribbean; Sidney Mintz' (1985) classic *Sweetness and Power*, a work of political ecology; Sucheta Mazumdar's (1998) *Sugar and Society in China*; and John Yudkin's (1986) *Pure, White, and Deadly*. These and many more are cited in Bosma's vast work.

Sugar deserves special attention. Certainly, no crop has entailed so much human misery for so little benefit. On the plus side, it makes life a bit sweeter. On the minus side, the sweetness leads to obesity, diabetes, heart disease, malnutrition, tooth decay, and much more (Yudkin 1972, 1986), while the cultivation has been the greatest drivers of the horrific slavery-and-plantation economy of the colonial world, and its survivor in the plantations and the "free" but desperately impoverished and maltreated workers of today. Sugar growers and the giant processing and foodmaking firms have enormously influenced politics, usually for the worse. Bosma wishes to tell the whole story yet again, bringing it up to date and adding a great deal about the sugar business. He tells the story in dry and cool scholarly form, but often the emotion breaks through as he recounts some particularly outrageous horror.

Humans are born to love sweets; injecting sweetener into amniotic fluid makes unborn babies drink more. The level of sweetness in modern foods, however, is unnatural by any standards. People used to traditional diets find modern mass-marketed foods too sweet, too salty, and too oily (picking up on two other innate tastes). The enormous use of sucrose is partly because of taste, partly also because sugar is what plants make most easily. They use photosynthesis to bond CO_2 and water into glucose or fructose—the same molecule, $C_6H_{12}O_6$, in dextro- or levorotatory forms—and those two into the combined molecule sucrose, $C_{12}H_{22}O_{11}$. The enzyme sucrase breaks this down into its components. Other enzymes then convert fructose into glucose and runs the body on that fuel. Some Inuit lack sucrase and cannot digest sucrose; it has the same effect on them as lactose on those who, as adults, cease to produce lactase, and cannot break down lactose into glucose and galactose. (Galactose is yet another $C_6H_{12}O_6$ sugar, with yet another structure, often forming a ring.)

Sucrose is the sugar of choice largely because sugar cane, *Saccharum officinarum* ("sugar of the drug store"), makes it. Fruits and other grass stalks tend to make either glucose or fructose, or both. Honey is a mix of the two, with water and pollen. Sugar from sugar cane has a slight health advantage, because the enzyme action to break it down takes some time; it gives us a sugar rush, but not as bad as that from fructose. Fructose tastes sweeter than glucose, and is converted into the latter in the liver, so eating a great deal of it stresses that overworked organ.

Bosma relates that sugar cane may have been domesticated in New Guinea, but its worldwide spread was from India. It apparently came up through

the islands and then the mainland of southeast Asia, but we know little about its early spread. The ancient Greeks knew of "honey from a reed," and soon the ancient world learned of the cane and began to grow it. The scientific name reminds us that sugar was first a drug, used for imagined health benefits and for sweetening otherwise unpalatable medicines. It soon became an indulgent.

Bosma describes the long history of developing increasingly sophisticated and cheap ways to extract cane juice, boil it down, and turn the resulting brown compound into white sugar. This involves separating out the molasses. Once difficult and tedious, this became easy and cheap, dooming our health. The problem was that the machinery involved in crushing the cane, extracting the juice, boiling it down, and separating the white from the brown was and is very expensive. Sugar cane itself is absurdly easy to grow. Thus, working in the cane was for the poorest of the poor, but vast amounts of capital were needed to run the "engines" that were at the centers of the plantations. This almost guaranteed that sugar would be a crop grown by desperately poor, and usually servile, labor employed by rich and powerful capitalists—a classic point made by all writers on the crop.

Smallholder sugar was possible only with major effort on the part of governments. It happened in China (Mazumdar 1998), where the millennia-old idealization of the free small farmer was too strong to deny. In the Canton Delta, this involved mounting the sugar milling equipment on boats and sailing them from farm to farm—difficult, but allowing China to avoid the curse of slavery in the sugar industry (Mazumdar 1998). Much later, smallholder sugar was developed in Cuba under communism, and very locally in southeast Asia and elsewhere. Bosma does not note that sugar long competed with honey in Europe; sugar bakers and honey bakers had separate and competing guilds. Sugar was more prestigious, and eventually won out.

Bosma returns to tell the story of developing reasonably cheap ways to make white sugar. This unfortunately coincided with the spread of empires. European colonies in the Western Hemisphere, India, and southeast Asia became sugar producing areas, especially the regions that are now Brazil, the Caribbean, India, and Indonesia. In all of these, cultivation was based on enslaved or other forced labor. Conditions were unspeakably horrible. Unlike cotton or tobacco, sugar was edible, but unlike peanuts or rice, it was nutritionally poor. Malnutrition was the common lot. In the eighteenth century, enslaved workers died within a few years. Enslaved people from Africa, and sometimes elsewhere, were numerous enough to be regarded as dispensable. It was cheaper to buy more than feed those on the ground.

Oddly, Bosma does not mention rum. Sugar was banked in rum just as grain was in whiskey and vodka. The old Atlantic "triangular trade" involved sugar from the Caribbean sent to New England to be made into rum, which was then taken to Africa and traded for enslaved workers. I had the dubious luck of experiencing some of the last New England rum. It was appalling, like trying to drink burning gunpowder. Its demise is unlamented. The Caribbean continues to produce rum of varying grades. Apparently, there is a stigma still attached to it, for I have seen sugar-cane alcohol (i.e., rum) sold as "vodka" and "whiskey" to give it class.

The horrors of slavery were first introduced to the world by Quaker activists. John Stedman (1988, original 1790) later made it well known in a blockbuster book. Anti-slavery action caught on in England. Bosma explains why it was less compelling in France or the Spanish world. England banned slave trading in 1807 and all slavery in the empire in 1834. The rest of the world slowly followed, Cuba and Brazil being the last holdouts in the 1880s. Unfortunately, liberation meant little to the workers, who continue to this day to live in appalling circumstances. Research by West Indian economists, notably W. Arthur Lewis (1939), not only revealed the ills attendant on sugar growing, but also developed the whole theoretical field of tropical colonial economics, including what came to be called "the development of underdevelopment." Sugar colonies and countries were kept poor and bare, producing the deadly crop for ever-richer metropolitan powers.

In the eighteenth century, the realization that beets contained sugar led to attempts to produce it. Beet sugar was developed under Napoleon as a way to avoiding British blockades. It cost more to produce than cane sugar, but money was saved on transport. Beet sugar took off, becoming a major crop by the early twentieth century, produced in the major European countries as well as the United States. In marked contrast to cane, it could be a smallholder crop, though often produced on large estates. Still, it

had the same problem of easy production but expensive processing. Farmers were often trapped in poverty, processors became rich.

Other crops were tried. Anti-slavery agitators in the eighteenth and nineteenth centuries advocated abstaining from cane sugar. In one case, Benjamin Rush, the anti-slavery signer of the Declaration of Independence, advocated maple sugar. Sorghum stalks were used, and sorghum syrup was popular in the old U.S. South. Malt syrup from grain had long been a sweetener in eastern Asia, but could never catch up with sugar.

Much later, in 1966, Japanese researchers learned how to make maize starch into a syrup that is a mix of glucose and fructose, the infamous "high fructose corn syrup" (HFCS) that now sweetens the world's drinks. Bosma tells the story of its devastating impact on sugar production, as HFCS spread like wildfire. The sugar industry desperately tried to fight it, but there was little they could do.

Meanwhile, the sugar industry developed in the colonizing countries, making enormous fortunes. Bosma's book is at its best when reporting this development. Earlier works on sugar concentrated on the plantations. Bosma is more interested than earlier writers in the capitalists and their schemes, and he has 40 to 50 years of further political shenanigans to discuss. He brings in the whole story of the millionaire buyers and processors. Among these was Claus Spreckels, a maverick German working-class young man, who came to California, made a fortune, got involved in typical plutocrat dealings, but never lost his working-class edge. Left out by Bosma, but well known to us Californians, was the Spreckels family's importance in funding liberal politics, from the Progressive movement to the New Deal. They had much to do with making California the "blue" state it is today. This seems to have been the sole time in history when sugar was associated with anything progressive.

Other captains of industry were less liberal. Bosma tells the story of the Fanjul brothers, who controlled sugar in Cuba. They later joined the migration of sugar titans to the United States, where politics in Florida shifted far to the right. The Fanjuls now control much of the world trade. There are also Florida's own sugar growers, who are engaged in highly subsidized and protected destruction of the Everglades by taking or polluting the water, while supporting Florida's most far-right politicians. Bosma's work shows how profoundly sugar has shaped extremist right-wing politics everywhere. It is far behind fossil fuels in political importance, but ahead of most other primary-production interests in its political reach.

Sugar consumption also began to receive unwanted attention early. By the sixteenth century, it was associated with tooth decay and obesity. By the late twentieth, it was also known to be involved in Type 2 diabetes and involved in heart disease. John Yudkin was the leading whistleblower, but was demonized by the sugar industry. Ironically, similar attempts by the meat industry to stop attacks on red meat were much less successful. We now know that red meat is basically good food and not much more, while sugar is truly damaging. Yudkin is proved right, too late (he died in 1995).

However, sucrose and fructose are not notably worse than other foods. Potato starch, white flour, and white rice have higher glycemic indexes (or indices), potato starch ranking 87 with glucose at 100. Glucose is thus theoretically worst of all, but not eaten in quantity. Sucrose ranks only 65 and fructose, surprisingly, 15, because of the slight but real difficulty that the enzymes have in converting them to glucose. The high glycemic index means that they produce a "sugar rush" in the blood and body, which causes a sudden release of insulin and a reaction that can turn inflammatory and lead ultimately to Type 2 diabetes. Summarizing all this, the latest book on obesity and metabolism to cross my desk, David Benton's (2024) *Tackling the Obesity Crisis*, lets sugar basically off the hook, blaming too many calories of any and all types for obesity, and situating them in the obvious social and economic context to explain why we are eating too many. Even so, sugar and sweetened drinks are a significant part of the story.

Sugar has thus attracted yet another truly epochal work, to join the earlier classics. Bosma compares his work with Sven Beckert's (2014) work on cotton (I reviewed it in these pages in 2017). Similar works on potatoes date back to Redcliffe Salaman's (1985, original 1949) *The History and Social Influence of the Potato*, which inspired several derivative works. Books on rice, maize, soybeans (starting with Piper and Morse 1923), grapes (and wine), and even chiles, as well as other world crops, all exist. In general, the crops that attract attention are those that have caused vast upheavals: empires rising and falling, trade in enslaved workers, great famines, and the like.

All these books, to varying degrees, focus on how the unique and specific characteristics of a crop influence its management and use by humans, and thus the history of humanity. In the case of sugar, the ease of raising it, the appeal of its sweetness, and the expense of processing it combined to make it a uniquely deadly commodity.

There is a striking lack of books on most of the great staple grains. Only rice seems to have attracted much attention. A recent work on wheat (Zabinski 2020) is worthy, but a brief and modest effort. Animals have not been neglected; we now have William Taylor's (2024) wonderful *Hoof Beats* to add to many works on the horse, and of course there are hundreds of books on dogs and cats. Other domestic animals have attracted at least some attention. We sorely need books on wheat, barley, rye, oats, millets, quinoa, and buckwheat that can stand with Bosma, Mintz, and other workers on sugar and plantation crops. Young ethnobiologists, step forward! If I had my life to live over again, I would work in that field.

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